FITCHBURG GAS AND ELECTRIC LIGHT COMPANY
ELECTRIC DIVISION RATE REQUEST

DIRECT TESTIMONY

OF

JAMES L. HARRISON

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Massachusetts Department of Telecommunications and Energy
D.T.E. 02-____

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I. INTRODUCTION

Q. Please state your name, address and position.

A. My name is James L. Harrison. I am a management consultant and vice president with the firm of Management Applications Consulting, Inc., 2921 Windmill Road, Suite 4, Sinking Spring, PA 19608.

Q. Please state your qualifications.

A. My qualifications are shown on Schedule JLH-1 (Electric).

II. SCOPE OF TESTIMONY

Q. Mr. Harrison, what is your responsibility in connection with this filing?

A. I am responsible for developing the accounting and marginal cost of service studies and for providing class revenue targets used in the, proposed rate design.

Q. Please outline the organization of your testimony and Schedules.

A. My testimony initially discusses the Accounting Cost of Service Study, followed by the Marginal Cost of Service Study. Finally, I will discuss the derivation of class revenue targets.

Schedule JLH-2 (Electric) contains the Class Accounting Cost of Service study (Schedule JLH-2-1) results and a separate Functional Cost of Service (Schedule JLH-2-2) study. Schedule JLH-3 (Electric) presents the results of the Marginal Cost Analysis. Class revenue targets are derived on Schedule JLH-4 (Electric).

The workpapers for each study have been compiled separately and provided with this filing.

Q. Did you make any adjustments to the billing data?

A. No. I did not.

III. ACCOUNTING COST OF SERVICE STUDY

Allocated Cost of Service Study

Q. Would you briefly define an Allocated Cost of Service Study.

A. The cost to serve the customers of any utility company consists generally of operating expenses and return. For a historical test period, these costs are on record and the overall cost to serve the collective customers of the utility may be readily established. On the other hand, the unique cost to serve customers of the various service classifications is much less apparent. Costs can vary significantly between customer classes depending upon the nature of their demands upon the system and the facilities required to serve them. The purpose of an Allocated Cost of Service Study is to assign or allocate each relevant component of cost on an appropriate basis in order to determine the proper cost to serve the respective classes. The result is a cost matrix displaying for each cost category the detailed costs of serving each customer class.

Q. Please describe the procedure that you used in preparing your Allocated Cost of Service Study?

A. Through the application of a computerized microcomputer cost model developed by Management Applications Consulting specifically for Fitchburg Gas and Electric Light Company's operations, it was possible to treat each element of Rate Base, Revenue and Operating Expense in detail and to assign or allocate each

item to customer classes. The complete process is reflected in Schedule JLH-2-1 (Electric) and mirrors Fitchburg Gas and Electric Light Company's electric division cost to serve as presented by Mr. Collin in his testimony and schedules.

Q. Please summarize Schedule JLH-2 (Electric).

A. This Schedule consists of two separate cost study results. The first study, labeled Schedule JLH-2-1 (Electric) presents the results of the class cost of service study where all supply costs have been removed, thereby showing only the remaining costs and revenues to be recovered from delivery rates. The study excludes all costs recovered through various recovery mechanisms instituted by the Department including the Seabrook Amortization Surcharge, the Energy Efficiency Charge, the Renewable Resource Charge, the Transition Surcharge, the Default Service Adjustment Charge and the SOS Generation Charge. This is a detailed class cost of service study which identifies listing each item contributing to the Company’s revenue requirements for delivery service only. Schedule JLH-2-2 (Electric) presents the second detailed functional cost of service study for Transmission and Distribution.

<u>Description of Cost Model</u>

Q. How does the computerized cost model operate?

A. The cost model is essentially a cost matrix. The vertical dimension of the study consists of the costs to serve as provided by the Company. The development of cost of service study begins with rate base and continues with revenues, operating expenses, taxes, and the computation of a labor allocator. The cost model includes three additional pieces, a summary of costs to serve, a list of the allocation factors employed in the study and a revenue requirements section.

The horizontal portion consists of either customer classes or cost functions. Since the customer classes cannot all fit on a single page, several sub-pages are required to list all customer classes.

Each page, starting with page 1 has an important column immediately preceding the numerical data marked "ALLOC", an abbreviation for ALLOCATOR. The ALLOC column contains an acronym to indicate the allocation factor used to allocate the costs shown in the Total Company Column to individual customer classes. A tabulation of these allocators in absolute form, typically total dollars or volumes and as a percent of total has been also provided at the end of the study, beginning on page 17.

Using these allocation factors, costs shown in the Total Company column are assigned to each customer class or function shown on the horizontal of the cost study. The cost of service information provided in the vertical column can be of two forms: either per books numbers as reported for the test year or pro forma adjustments, to reflect the adjustments identified by Mr. Collin in his testimony and schedules.

Cost of Service Model Allocation Methodology

Q. Would you please explain how you chose allocation factors for your cost study?

A. In the cost allocation process, I reviewed each cost element to determine the intended use of specific plant investments and then examined the specific use of these assets in the test year. Then I developed an external allocator or selected an appropriate internal allocator to assign these costs to customer classes.

Rate Base Allocation

Q. Mr. Harrison, please describe the allocation of rate base to customer classes.

A. Rate base allocation is shown on pages 2 through 7 of Schedule JLH-2-1 (Electric). The Company's transmission plant investment were assigned to the capacity component and allocated to classes using a twelve coincident peak average (12CP) allocation factor. The transmission costs within my cost study include all of the Company's internal transmission costs but exclude external transmission costs. Although transmission costs are included in the total revenue requirements, my cost of service model has been design to segregate transmission and distribution revenue requirements for rate design purposes.

Capacity related distribution plant was allocated on three different allocation factors in recognition of the load diversity across the distribution system. Substations, connecting the transmission system to the poles and lines of the distribution system were allocated on the average of the twelve coincident peak demands and the class peak demands. Poles, conductors and conduit and underground conductors were separated into primary and secondary cost categories and allocated on class peaks. Line transformers, serving only a few customers each, were allocated on the average of class peaks and the sum of the individual customer maximum demands.

Q. What are the customer-related allocation factors included in your cost study?

A. Customer-related plant items were allocated using **CUST**-prefixed allocators for services, meters, and other such customer-related items. These factors, taken from the Company's continuing property records, general accounting records, and any other available sources, serve to allocate the specific customer-related costs incurred for each customer class. A complete list of each allocation factor has been provided at the end of each cost of service study.

The allocation of services deserves additional discussion. As with most utilities, the Company's continuing property records provide little insight into the proper allocation of these costs to customer classes. The Company's engineering department developed a range of typical service installations from their past experience. Estimated cost for each service was computed and a weighted average was developed to estimate replacement cost new for each rate class's services.

Q. How did you account for the fact that smaller customers often share a common service with other customers?

A. I adjusted the average service cost for each class by a services per customer ratio. For example, one service to an apartment complex or office building can serve several customers. I assumed that only small customers shared services. I assigned one service to each larger customer and subtracted the number of assigned services from the total number of services shown in the Company's property records. I divided the number of remaining services by the total number of residential and small GD-6 customers to develop an appropriate service per customer ratio for these classes.

The final step was to develop the services allocator. I multiplied each class's estimated cost per service by the services per customer ratio and the number of customers in the class. The resulting values were summed and prorated by a uniform percentage to match the original cost investment shown in the Company's books.

Q. How was general plant allocated on page 3 of Schedule JLH-2-1 (Electric)?

A. All items of general plant were allocated on an internally generated labor allocation factor (**LABOR**) based on labor expensed and capitalized for each account in the test year. Each Operations and Maintenance function was

examined to determine the labor portion of expense included. The labor portion of these costs were allocated separately in the same manner as the total accounts were allocated. Similarly capitalized labor costs were assigned to classes on the same basis as the plant function. The allocated labor costs were then subtotaled by class to arrive at the composite allocation factor **LABOR**.

Q. How was each account of reserves for depreciation allocated?

A. Each account of reserves was allocated on the subtotal of the corresponding allocated costs of its respective plant item.

Q. What other elements of rate base were included in your study?

A. Additions to net plant included materials and supplies, and an allowance for cash working capital. The deductions from net plant were customer deposits, and a reserve for deferred federal income taxes. Each item was allocated on the most appropriate allocation factor. For example, deferred taxes was primarily allocated on PLANT. The cash working capital excluding purchase power was developed internally using a forty five day allowance by totaling the allocated operation and maintenance expenses. The remaining cash working capital costs relating to purchased power was developed by a separate analysis and allocated using kWh sales adjusted for losses.

<u>Operating Expense Allocation</u>

Q. How were operating expenses allocated?

A. The allocation of O&M expenses follows the method by which these expenses were incurred. Therefore, the plant-related capacity expenses are allocated using the same allocators used for their associated plant investment.

Q. How were purchased power costs allocated?

A. As I mentioned earlier, these costs were excluded from my study.

Q. How were the remaining Operation and Maintenance Expenses allocated?

A. Transmission and Distribution O&M expenses follow the corresponding allocation of transmission and distribution plant. Customer Accounts, Sales Expenses, and Administrative and General Expenses were allocated using a variety of methods based on direct assignments, revenues, sales, electric costs, number of bills and number of customers. Whenever possible, specific information detailing class cost responsibilities was utilized in order to develop the most accurate cost study possible. Externally developed allocators were developed for Accounts 902, 903 and 904. For example, Account 902, Meter Reading Expense, was allocated to customer classes on an externally developed allocator (**CUST902**) which weighted the number of meters with the frequency and cost of the meter reading. A&G expenses are allocated partly on the labor allocator, partly on revenue requirements and partly on plant in service, all developed internally.

For all other accounts, some form of labor or plant allocator was chosen in order to best represent the nature of the costs in the expense category to be allocated. The workpapers contain a complete detail of the development of each allocator utilized in the cost of service study.

Q. What are the remaining operating expenses?

A. The remaining operating expenses consist of depreciation and amortization expenses, taxes other than income taxes, state franchise taxes and federal income taxes.

Q. How were they allocated?

A. Depreciation expenses were allocated on the basis of plant in service similar to the allocation of depreciation reserves. Taxes Other Than Income Taxes, that are

plant related, were allocated on **PLANT** and those that are labor related were allocated on the **LABOR** allocator discussed earlier. Federal income taxes and state franchise taxes were computed for each customer class based on the allocated expenses previously discussed.

Accounting Class Cost Study Results

Q. Could you summarize the results of your cost study at present rates?

A. The cost of service results demonstrate that the rates presently in effect generate different rates of return for each customer class. As page 1 of Schedule JLH-2-1 (ELECTRIC) clearly demonstrates, the Company's current rates produce inequities among rate classes. For example, the lighting class generates much lower rates of return.

Q. Have you prepared any unbundling cost of service studies as part of your efforts to analyze the Company's overall costs?

A. Yes, I have. Following the standard cost allocation procedures outlined earlier in my testimony, I have aggregated costs and prepared a detailed unbundled cost of service study for the transmission and distribution functions. These results are presented in Schedule JLH-2-2 (Electric). This schedule shows the allocation of each account of plant and expenses that make up the cost of service with the functional allocation factors provided beginning on page 17.

MARGINAL COST OF SERVICE STUDY

Overview of Marginal Cost Study

Q. Please summarize the objectives of a marginal cost study.

A. A marginal cost study provides an estimate of the cost of providing an additional unit of service. These estimates are utilized as guideposts in setting rates to the extent allowed by considerations of rate continuity and intraclass equity. As many regulators have found, the use of marginal costs in rate making will result

in a level and pattern of prices that promote appropriate consumption decisions and an efficient allocation of society's resources. Efficiency is furthered by sending consumers accurate price signals regarding the costs that will result from their consumption decisions. Customers, in turn, will be able to make informed decisions on their use of utility service.

Q. Please summarize the different elements of a marginal cost study.

A. A typical marginal cost estimate contains several components. The marginal transmission and distribution components are intended to reflect the unitized cost, based on historical data and recent trends, of expanding the local transmission and distribution network to accommodate growth in customers' requirements. The marginal customer costs reflect the unitized cost, based on engineering estimates, to add a customer to the system in each of the customer classes.

The study excludes all production costs, as they are irrelevant to the design of transportation and distribution rates based on the current regulation of the DTE.

Q. Would you please summarize the methodology you employed?

A. I have computed the marginal costs to serve each of Fitchburg Gas and Electric Light Company's rate classes based on rate year costs. My methodology is relatively straightforward. I have used regression and engineering techniques to estimate the hypothetical transmission and distribution costs of serving an increment of customer load, including the unit costs of adding distribution plant facilities as well as the additional costs for operations and maintenance. I have used engineering estimates to identify the investment in services and meters and added O&M expenses necessary to serve a new customer. From these factors, I have developed the annual revenue requirements to serve each of Fitchburg Gas and Electric Light Company rate classes. These costs are stated in terms of customer energy and demand charges.

Q. Mr. Harrison, what time periods did you select for the evaluation of marginal costs?

A. I used three different time periods in my marginal cost study:

(1) The coincident peak hour,

(2) The peak period as defined in the Company's tariffs, and

(3) The off peak period.

The coincident peak hour was the period used to measure capacity costs and represents the extreme load on the system each year. The Company's peaks are well balanced between the summer and winter as evidenced by the fact that the peak occurred frequently in both summer and winter seasons. In order to develop a consistent set of historical data, the historical actual peaks were adjusted to remove an extremely large energy intensive industrial load that was only present of the system for a few years and subsequently closed and liquidated its operations.

The peak period is defined as the weekday non-holiday hours from 7 AM to 10 PM. The off peak period is all remaining hours in the year.

Q. Did you consider re-defining the peak and off-peak periods?

A. No. I was instrumental in selecting these time period over twenty years ago, as part of the Company's filings pursuant to the Public Utilities Regulatory Policies Act of 1978 (PURPA). The peak period was deliberately chosen to encompass virtually all hours of the year likely to contain a coincident peak load. Unlike most utilities in the northeast, the Company did not have a predominant seasonal peak; air conditioning driven summer peaks are matched by space heating driven winter peaks. This seasonal trait continues to this day. I performed a probability

of peak analysis using four recent years of hourly load data and verified that the peak period contains over 99% of the probability of peak.

Q. Mr. Harrison, how have you organized your marginal cost Schedule JLH-3 (Electric)?

A. The marginal cost study consists of thirteen different tables and supporting calculations. The organization of my Schedule can more readily be understood by referring to the attached flow chart (Figure 1) which shows the logical progression of the calculations. The marginal cost study begins with plant investment data and proceeds through to the development of marginal unit costs to serve. The unit cost results from the marginal cost study are shown on Table 13. However, the other twelve tables present the calculations leading to these summary results are an integral part of my marginal cost study.

Q. Referring to the flow chart in Figure 1, could you provide a brief overview of the marginal cost study?

A. The first three tables develop the plant investment necessary to serve growth. Table 1 develops the Transmission investment costs and Table 2 addresses the capacity-related distribution plant investments, while Table 3 addresses customer-related investments to the distribution system. Consistent with my past studies, Table 4 would normally detail the development of estimated marginal production O&M expenses however Table 4 is indicated as Not Applicable since it is irrelevant to rate design efforts in this docket. Table 5 computes marginal Transmission capacity-related O&M expenses. Table 6 computes marginal Distribution capacity O&M expenses. Table 7 estimates customer-related O&M expenses. Table 8 develops loading factors used to account for marginal costs not individually estimated, such as administrative and general expenses as well as levelized fixed charge rates used to translate one-time capital investments into annual revenue requirements. Tables 9, 10, and 11 summarize the results of all

prior calculations, depicting the quantification of marginal capacity, energy, and customer-related costs, respectively. Table 12 summarizes these component costs and the total marginal costs to serve. Finally, Table 13 converts the Table 12 total costs into units of marginal costs. If rates were to be designed optimally for efficiency with no other outside considerations, such as generating the Company's allowed revenue requirement or insuring reasonable impacts to existing customers, these marginal unit costs would be used as the proposed rates.

Capacity Costs

Q. Please describe your calculation of marginal capacity costs.

A. Demand or capacity costs for electric utilities may consist of production, transmission and distribution functions. Production capacity costs are typically the unitized costs of expanding the Company's production capability to meet a long-run increase in customers' requirements for electric service. In the unbundled market that the Company now operates, it incurs no marginal costs to provide production service. Instead, the Company operates as a supply agent and passes these production costs along to those who desire it. The Company's delivery rates have no requirement to include any production costs, as these costs are recovered through separate clauses.

Q. Please describe your analysis of marginal transmission capacity costs.

A. The method of measuring transmission capacity costs is based on discussions with planners indicated that system design was driven by the need to provide adequate capacity at times of peak. Consequently, coincident peak demand became the causative factor driving transmission investment.

Long run marginal costs for historical transmission investments, cumulative plant investments were calculated as shown on Table 1, pages 1 and 2. The

investments were calculated based on individual account Trended Additions less Trended Retirements, using the Handy-Whitman Index.

The regression results are sufficiently robust for estimating long-run marginal costs.

Q. Please describe your analysis of marginal distribution capacity costs.

A. Discussions with planners indicated that system design was driven by the need to provide adequate capacity at times of peak. For ease of measurement, coincident peak demand was employed as the causative factor driving distribution investment.

Distribution capacity costs are complicated by the need to expand capacity on both the primary and secondary systems. Many large customers take service at the primary voltage level and do not benefit from the existence of secondary lines. Consequently, the marginal cost study is careful to segregate costs for primary and secondary facilities.

In order to accurately estimate current marginal costs from historical distribution investments, the historical capacity-related additions were identified and restated in 2001 dollars on Table 2, page 2, using the Handy-Whitman Index for Public Utility Costs.

The regression estimates for both Primary and Secondary are sufficiently robust to estimate the long-run marginal costs

Q. How did you compute the capacity-related component of Transmission and Distribution O&M expenses?

A. The calculation of capacity-related component of transmission and distribution Operations and Maintenance (O&M) expenses are shown on Tables 5 and 6 for transmission and distribution, respectively. Marginal transmission O&M expenses were estimated using the average unit cost over the past three years. The analysis of distribution O&M costs begins on Table 6, page 2. Costs are segregated between capacity and customer cost components. Capacity costs are further divided between primary costs, common to all distribution customers, and secondary costs which are assigned to secondary voltage customers only. Marginal distribution O&M expenses were estimated using the same three year average unit cost since the regressions were relatively weak.

Q. Please describe the development of marginal capacity costs on Schedule JLH-3 (Electric), Table 9.

A. Table 9 develops marginal capacity costs for transmission and distribution functions. Plant investments identified in Tables 1 and 2 are grossed up to include general plant. These investments are then annualized by applying the fixed charge rate developed on Table 8. To this amount, annual operating expenses are added, including an allowance for administrative and general expenses. An adjustment reflecting annual revenue requirements to finance working capital is added. Next, the indicated unit costs were increased to reflect unaccounted for losses experienced. Finally, these costs were escalated from test year to rate year levels.

<u>Energy Costs</u>

Q. Please elaborate on your calculation of marginal energy costs.

A. Marginal energy costs are excluded from this study as they are irrelevant to the competitive market pricing of production supplies. Consequently, both Tables 4 and 10 are shown as “Not Applicable” in Schedule JLH-3 (Electric).

Customer Costs

Q. Please describe your calculation of marginal customer costs.

A. The long-run marginal costs of serving an additional customer were determined to be a function of the size of the customer and the class of service. Three different customer costs were computed, representing the costs of connecting and serving a customer for each of the Company's new rate categories. These customer costs consisted of:

(1) Plant investment in services and meters,

(2) Related operations and maintenance expenses, and

(3) Billing costs such as customer accounting and customer information expenses.

Q. How did you compute customer-related plant investment?

A. I began with services, as shown on Table 3, page 1. I computed average replacement costs new for each customer class and then factored them by the services-per-customer ratio. Meter investment was also developed from the Company’s engineering estimates including the current cost of typical meters used for each customer class, and the Company’s engineering estimates of the current installation costs. Next, the costs of installed meters were factored by meters per customer ratios to recognize the existence of inactive meters and the need for spares.

Q. Please describe your computation of customer-related operations and maintenance expenses.

A. These calculations are summarized on Table 7, consisting of five pages. On page 3, customer-related distribution operations and maintenance expenses previously identified on Table 6, page 2, were restated in current dollars, using the GDP Implicit Price Deflator as a cost index. The expense was regressed against customers and also, the average cost was regressed against the time series. Both

regression showed little correlation suggesting that the more recent three year average cost be used as a reasonable estimate of marginal costs to serve a new customer. Page 2 of this table shows the allocation of costs to customer classes, based on the services and meters investments required.

Page 1 of this Schedule, shows the development of customer accounting and marketing services expenses. In general, the number of customers has been increasing only slightly, while these customer-related expenses have been increasing at a greater rate. The time series regression of the average cost per customer is sufficiently robust to be used for the average marginal customer-related costs. The cost per year was not assumed to be equal for all customer classes. Using the causal relationships identified in my Allocated Cost of Service Study, Schedule JLH-2-1 (Electric), I computed marginal customer costs for each customer class on Table 7, page 4.

The customer charges shown on Table 7, page 4, specifically exclude uncollectible accounts expense. A separate analysis of the uncollectible costs is shown on Table 7, page 5. On this table, a portion of uncollectible accounts expenses is functionalized as electric supply related, based on each class's electric supply costs as a percentage of its total annual marginal cost based revenue requirements.

Q. Please summarize Schedule JLH-3 (Electric), Table 11.

A. Table 11 shows the development of marginal customer-related costs by class. Plant investments for customer-related costs shown on Table 3 were converted to an annual expense, using the appropriate fixed charged rate from Table 8. Annual expenses from Table 7, loaders from Table 8 and working capital requirements were added in a manner analogous to capacity costs, as explained

previously. Finally, costs were restated in rate year dollars, using anticipated price escalation.

Q. What is the purpose of Schedule JLH-3 (Electric), Loading Factors in Table 8, pages 2 and 3?

A. Table 8, pages 2 and 3, develops loading factors used in the marginal cost study. Loading factors are used to compute estimates of marginal costs where direct quantification is either too complex or the costs are insignificant. In the former category, administrative and general expenses are only indirectly related to customer load characteristics. To simplify quantification of marginal costs, A&G costs are related to other operations and maintenance expenses or plant-related items. All loading factors are calculated and either a 13 year average or, when significantly correlated, a time series forecast is used.

The top of page 3 shows the development of a energy loading factor used to increase energy costs for other non-fuel variable O&M costs. Over the 13 years from 1989 to 2001, these non-fuel variable costs were averaged.

Losses, sales unaccounted for, and company use cannot be directly attributable to classes and are computed as a loss factor for use on Tables 9 and 10. Page 3 of Table 8 also develops loading factors for Materials and Supplies and Prepayments, Fuel Inventory, and General Plant.

Q. Would you explain the development of the carrying charge rates shown in Schedule JLH-3 (Electric), Table 8?

A. Table 8 also details the development of the levelized fixed charged rates for peaking production facilities, capacity-related distribution plant and customer-related distribution plant. These rates are used to convert one-time investments into annualized revenue requirements, necessary for pricing. For rate-making

purposes, utility investments in fixed plant are normally treated as rate base items. Utility rates are established periodically to allow the recovery of costs incurred in ownership, including such items as return, taxes, depreciation, etc. Rather than deal with an irregular set of annual costs stemming from ownership of assets, levelized fixed charge rates compute the present worth of all revenue requirements stemming from utility ownership of an asset, and then provide an equivalent annual payment stream of identical present worth.

The development of a levelized fixed charge rate applicable to transmission capacity-related investment is shown on pages 4, 5 and 9. The calculations for capacity-related distribution plant (pages 4, 6 and 10), services (pages 4, 7 and 11), and metering investment (pages 4, 8 and 12) are similar. For simplicity, I will only discuss the calculation of the transmission plant carrying charge rate.

Page 4 shows the input assumptions used to develop levelized fixed charge rates. A hypothetical investment of $1,000 is used for demonstration purposes. Page 13 shows the development of weighted average service lives and salvage values used as input into the computations. Using current property tax rates and incremental income tax rates, the calculation of annual utility revenue requirements stemming from the initial $1,000 investment are shown on page 9.

Page 5 displays two different fixed charge rates; the "engineer's" and "economist's" fixed charge rates. The first fixed charge rate is akin to a banker's conventional fixed rate mortgage. This value represents a percentage of the original investment which must be made in current year dollars, in order to equate to the present worth of the utility's revenue requirements. The economist's fixed charge rate differs slightly, in that is assumes that payments will escalate each year by the rate of inflation. Inherent in the engineer's fixed charge rate is the assumption that an asset is depleted more rapidly at the outset than toward the end

of its service life. The economist's fixed charge rates makes the opposite assumption--that an asset's utility at the beginning of its service life is equal to its value at the end of its service life. In the electric utility industry, old plant is nearly as useful as new plant. As an example, meters provide the same service at the beginning of their lives as they do at their end. Consequently, the economist's fixed charge rate was used to convert one-time plant investments into annual revenue requirements.

Summary of Marginal Cost Results

Q. Please describe Schedule JLH-3 (Electric), Tables 12 and 13.

A. Table 12 tabulates the long-run marginal costs computed on Tables 9, 10 and 11. In addition, this table calculates the revenues that would be generated if the Company were to introduce full marginal cost-based pricing and if customers were to continue to consume as they have in the past. Table 12, page 2 depicts the Distribution Only long-run marginal costs as computed on Tables 9, page 3, 10 and 11.

Table 13 derives unit costs based on billed sales in the peak and off-peak periods. Annual revenue requirements by time period from Table 12 were divided by peak and off-peak sales to derive unit costs. If marginal cost based rates were not constrained to utility allowed revenues and if economic efficiency were the only goal of rate design, the marginal cost figures could be considered marginal cost-based prices. Obviously, these prices would be impractical to implement without further adjustment. Table 13, page 2 shows the same information for Distribution Only unit costs based on Table 12, page 2.

RATE DESIGN

Q. Have you summarized the costs that should be considered in the rate design process?

A. Yes, all of this information is included in Schedule JLH-4 (Electric), rate design. Page 1 summarizes present revenues excluding production costs and shows class revenue requirements based on the both accounting and marginal cost study results. The accounting cost study results are shown at equalized rates of return for all classes. The marginal cost study results are also shown for comparison purposes. In order to allow direct comparison, the delivery service revenue requirements from the MCS have been adjusted equi-proportionately to match the Company's delivery service revenue requirements from the accounting cost study. This calculation is shown on page 2. Page 3 of Schedule JLH-4 (Electric) presents the derivation of class revenue targets to be used as a starting point for rate design efforts.

Schedule JLH-4 (Electric) Page 3 shows the derivations of revenue targets for each customer class. The computation begins with the comparison of present revenues and those revenues that would be generated if each customer class produced the Company's requested rate of return, as shown in the accounting cost of service study. The resulting increases or decreases varied considerably from one class to the next. In order to provide some level of revenue stability and avoid undue customer impacts, class revenue requirements have been limited with a maximum cap or a minimum increase. This rate cap was set at 125 percent of the overall average increase requested by the Company. The minimum revenue target was established at present levels, i.e. no customer class is to receive a decrease. The imposition of the rate cap limits the increase to some classes and therefore requires subsidies. In the same vein, the requirement that all classes receive an increase imposes indirect subsidies on those classes that would otherwise receive a decrease. The subsidies must be recovered from those

remaining classes who are not capped. Preliminary revenue targets are initially generated by allocating the subsidies to the remaining classes on a pro rata basis. As a final step, I computed the low income discount provided to residential customers. The low income subsidy is computed as the difference between the discounted and un-discounted rates. I allocated the low income subsidy back to all classes using a rate base allocator. The resulting revenue targets become the starting point for all rate design activities.

Page 4 of Schedule JLH-4 (Electric) tabulates the rate design information provided to Ms. Asbury and employed in the proposed rate design.

Q. Does this conclude your testimony?

A. Yes, it does.

VII. LIST OF SCHEDULES

Schedule Number	Description
JLH-1 (ELECTRIC)	Qualifications of James L. Harrison
JLH-2 (ELECTRIC)	Accounting Cost of Service Study
	-1 Class Cost of Service Study
	-2 Functional Cost of Service Study
JLH-3 (ELECTRIC)	Long-Run Marginal Cost Study
	List of Tables
	Detailed Analysis
JLH-4 (ELECTRIC)	Rate Design Information
JLH-5 (ELECTRIC)	Workpapers